

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : D03D 1/02, B60R 21/16		A1	(11) International Publication Number: WO 96/27702 (43) International Publication Date: 12 September 1996 (12.09.96)
(21) International Application Number: PCT/SE96/00267 (22) International Filing Date: 1 March 1996 (01.03.96)		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(30) Priority Data: 9500771-2 3 March 1995 (03.03.95) SE		Published <i>With international search report. In English translation (filed in Swedish).</i>	
(71) Applicant (for all designated States except US): FOV FABRICKS AB [SE/SE]; P.O. Box 165, S-501 04 Borås (SE).			
(72) Inventors; and (75) Inventors/Applicants (for US only): JOHANSSON, Mats [SE/SE]; Första Villegatan 14, S-502 44 Borås (SE). LÖNGÅRDH, Gunnar [SE/SE]; Grudegatan 10, S-502 45 Borås (SE).			
(74) Agent: AWAPATENT AB; P.O. Box 11394, S-404 28 Göteborg (SE).			

(54) Title: USE OF CLOTH OF HIGH TENSILE AND TEARING STRENGTH FOR AIRBAGS

(57) Abstract

The invention relates to the use of a cloth possessing high tensile and tearing strength. It consists of a fabric comprising multifibre yarns of approximately equal coarseness which are interwoven in a special binding pattern with the yarn density in the warp and in the weft being approximately the same. The cloth uncoated or combined with a polymer film is intended to be used as the material for impact-protective, inflatable air bags for vehicles.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	L1	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Larvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MIR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

**Use of cloth of high tensile and tearing strength
for airbags.**

The subject invention relates to the use of a cloth possessing high tensile and tearing strength. More precisely, the invention relates to a cloth of the kind consisting of a fabric comprising yarns of approximately 5 equal coarseness which are interwoven in a special binding pattern with the yarn density in the warp and in the weft being approximately the same. Said binding pattern is arranged in such a manner that the weave repeat comprises six warp yarns and six weft yarns and 10 according to which pattern the first and the fourth weft yarns pass above the first, the second, the fourth, and the fifth warp yarns, the second weft yarn passes above the first, the third, and the sixth warp yarns, the third weft yarn passes above the second, the third, and the 15 sixth warp yarns, the fifth weft yarn passes above the third, the fourth, and the sixth warp yarns, and the sixth weft yarn passes above the third, the fifth, and the sixth warp yarns.

Cloths of this kind have been used for some years as 20 a technical textile fabric to be used for various purposes, such as for tarpaulins, covers and for other applications. A great advantage inherent with this type of cloth is that its particular binding pattern gives the cloth a considerable tensile strength as well as tearing 25 strength in the warp as well as in the weft directions. In addition, the binding pattern provides a high degree of balance not only of the tensile strength in the warp and weft directions but also of the tearing strength in both directions, which is not the case in conventional 30 simple two-shaft fabrics with symmetrical setting.

It has now been found that the above cloth lends itself excellently well for use as the material of inflatable air bags, such as e.g. air bags used in

vehicles. The requirements that the material for such bags must meet are extremely high. When folded and compacted, air bags form packages of a comparatively reduced size since the available volume always is small.

5 In the event of release induced by a vehicle collision, the air bag should be inflated within only approximately 40 msec in order to rapidly provide satisfactory impact protection.

Owing to its high strength qualities, the cloth 10 described above has proved to function extremely well in the applications referred to. In addition, the cloth is more flexible and more adaptable than fabrics hitherto used for the manufacture of air bags. This feature is of uttermost importance when the air bag is to be folded and 15 packaged in a module housing. The space available to the air bag in a module housing is very restricted. In this respect, the high tearing strength of the cloth could likewise be of life-saving importance. Also its tensile qualities are favourable in this connection.

20 In order to illustrate the merits of the cloth in more practical terms, a specification is given below of the strength relationships in a conventional two-shaft weave compared with those in a weave in accordance with the invention. The weave has a yarn diameter of 470 dtex 25 and a yarn density of 20 x 20 yarns/cm.

<u>Tensile strength (N/5cm)</u>	
30	2-shaft weave
	Weave of invention

} = 3000

Tearing strength (in N)

5

Uncoated weaveSilicone coated weave

Two-shaft weave (1/1 binding):

warp & weft directions = 120 = 220

Weave of Invention:

10 warp & weft directions = 170 = 400

15 The higher tearing strength of the weave in accordance with the invention thus provides opportunities for the manufacture of air bags meeting very high demands on strength and durability.

CLAIMS

1. The use of a cloth possessing high tensile and tearing strength and consisting of a fabric comprising yarns of approximately equal coarseness which are interwoven in a special binding pattern with the yarn density in the warp and in the weft being approximately the same, the weave repeat of said binding pattern comprising six warp yarns and six weft yarns and according to which pattern the first and the fourth weft yarns pass above the first, the second, the fourth, and the fifth warp yarns, the second weft yarn passes above the first, the third, and the sixth warp yarns, the third weft yarn passes above the second, the third, and the sixth warp yarns, the fifth weft yarn passes above the third, the fourth, and the sixth warp yarns, and the 15 sixth weft yarn passes above the third, the fifth, and the sixth warp yarns, characterized in that the cloth, uncoated or combined with a polymer film, preferably a silicone film, is used as the material for impact-protective, inflatable air bags for vehicles.

INTERNATIONAL SEARCH REPORT

International application No. PCT/SE 96/00267
--

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: D03D 1/02, B60R 21/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: D03D, B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT, CLAIMS, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ^a	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0018335 A1 (ALMEDAHLS AB), 29 October 1980 (29.10.80), figures 2,3, abstract --	1
Y	US 5277230 A (J.A. SOLLARS, JR.), 11 January 1994 (11.01.94), figures 1-5, abstract --	1
Y	Orbit Search Service, File WPAT, Accession number 95-138903/18, WACKER SILICONES CORP. ET AL, CA2122071-A 95.02.27 (9522) --	1
Y	Orbit Search Service, File WPAT, Accession number 93-236653/30, SHINETSU CHEM CO LTD ET AL, JP05202338-A, 93.08.10 (9336) --	1

 Further documents are listed in the continuation of Box C. See patent family annex.

- ° Special categories of cited documents
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "B" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

18 June 1996

Date of mailing of the international search report

19 -06- 1996

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. + 46 8 666 02 86

Authorized officer
Catarina Forssén
Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/04/96

International application No.

PCT/SE 96/00267

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A1- 0018335	29/10/80	AT-T-	3157	15/05/83
		SE-B,C-	421016	16/11/81
		SE-A-	7902880	03/10/80
US-A- 5277230	11/01/94	CA-A-	2114684	23/08/94
		EP-A,A-	0612644	31/08/94
		JP-A-	6298028	25/10/94